standard weight pipe, Schedule 40, shall be used. Galvanizing shall be done after fabrication and punching or drilling of holes that may be permitted on the Plans, except as provided herein. Cap plates shall be structural steel, AASHTO M 183 galvanized, in accordance with AASHTO M 111 or other materials when shown on the Plans.

Sign posts used for signs that are minor items or incidental construction, when approved by the Engineer, may have holes drilled or punched and one end cut to length after galvanizing— provided that the exposed metal surfaces shall be regalvanized, metalized, or painted with an approved zinc dust-zinc oxide paint.

721.02. WIDE FLANGE BEAM POSTS.

Galvanized steel wide flanged beams shall be new material of the size shown on the Plans and shall conform to the requirements of AASHTO M 183. Galvanizing shall be in accordance with AASHTO M 111 and shall be done after punching or drilling of any holes or cutting that may be permitted by the Plans or by the Engineer.

721.03. SQUARE TUBE POSTS.

Square tube posts shall be made from new hot- rolled carbon sheet steel, structural quality, ASTM A 570-79. The finish shall be in-line, hot- dip galvanized zinc coating per AASHTO M-120, followed by a chromate conversion coating and a clear organic exterior coating. The posts shall have 7/16 inch (11.1 mm) diameter holes or perforated holes spaced 1 inch (25.4 mm) on center along the center of each of the four sides. A type C certification from an approved manufacturer shall be provided with each lot or shipment and shall be completed by the supplier for each project quantity.

721.04. FLANGE CHANNEL POSTS.

Galvanized flange channel posts shall be new material of the size shown on the Plans and shall conform to the requirements of AASHTO M-183. Galvanizing shall be in accordance with ASTM A 123 and shall be done after punching or drilling of any holes or cutting that may be permitted by the Plans or by the Engineer.

SECTION 723
REINFORCING STEEL

723.01. BAR STEEL REINFORCEMENT - (BILLET STEEL).

This Specification covers plain and deformed billet steel bars for concrete reinforcement and dowels used in the work. The billet steel bars shall meet the Specification requirements of AASHTO M 31, grade 40 (300) or grade 60 (400). Furnish reinforcing steel bars of structural grade 60 (400) unless otherwise specified and shown on the Plans.

Sample two bars, not less than 24 inches (600 mm) in length, from each lot of bars in the shipment and furnish the chemical analysis report with each lot. The term “lot” used in this paragraph means all bars of one size up to 10 ton (10 metric ton) bearing one manufacturer’s roll mark.

723.02. AXLE STEEL.

This Specification covers deformed and plain axle steel bars for concrete reinforcement and dowels which may be used in lieu of those as specified in Subsection 723.01. Axle steel bars shall meet the Specification requirements of AASHTO M 53. Furnish reinforcing steel bars for structural grade 60 (400) unless otherwise specified and shown on the Plans.

Sampling shall conform to Subsection 723.01 above- except that the carbon range for each lot will be required in lieu of a full chemical analysis.

723.03. WELDED STEEL WIRE FABRIC.

These Specifications cover cold drawn steel wire to be used as such, or in fabricated form, for the reinforcement of concrete.

The fabric shall comply with the requirements of AASHTO M 55 or AASHTO M 221. The size and spacing of wires in the fabric shall be as shown on the Plans. Welds shall be of sufficient strength that they will not be broken during handling or placing.

Furnish reinforcing fabric in flat sheets or rolls. If any materials have become bent or distorted, straighten or otherwise put them in proper condition before using them. When placed in the work, the fabric shall be free from excessive rust, scale, or coating of any character which will impair its bond with the concrete.

Cut two samples at least 24 inches (600 mm) per side from the fabric and submit them for each different bar size in the fabric. Submit samples for each 10 tons (10 metric tons) or less of material.

723.04. STEEL WIRE STRAND FOR PRESTRESSING.

Steel wire strands for prestressing shall conform to the Specifications for "Uncoated Seven-Wire Stress-Relieved Strand for Prestressed Concrete," AASHTO M203, including Supplement I, "Low Relaxation Strand," except that a Type A certification shall be furnished for each reel or coil of strand included in the work.

NOTE: When stress-relieved strand is specified, conformance to Supplement I of AASHTO M203 is not mandatory.

All strand shall be Grade 270 unless otherwise specified.

723.05. BARS FOR POSTTENSIONING.

Bars shall be high strength alloy steel bars meeting the requirements of AASHTO M 275. Furnish a type A certification for each heat of material.

723.06. POSTTENSIONING STEEL WIRE.

Steel cable for posttensioning shall conform to the Specifications for Uncoated Stress-Relieved Wire for Prestressed Concrete, AASHTO M 204, Type BA or WA. Furnish a type A certification for each coil of wire.

When low-relaxation wire is specified, it shall meet the requirements of the supplement to AASHTO M 204.

723.07. ANCHORAGES FOR POSTTENSIONED TENDONS.

All anchorages shall be capable of detensioning or retensioning prestressing steel at any time prior to grouting. The load from the anchoring device shall be distributed to the concrete by means of approved devices.

Anchorages shall develop the specified ultimate strength of the tendons without exceeding anticipated set.

Bending stresses in the plates or assemblies induced by the pull of the prestressing steel shall not exceed the yield point of the material. All parts of the anchoring devices will be at least 2 inches (50 mm) inside the final end surfaces of the members. Furnish a type A certification for each heat of anchorage plates.

723.08. COLD DRAWN STEEL WIRE.

Cold drawn steel wire for concrete reinforcement for spiral ties and other reinforcing designated on the Plans in "W" (Wire) sizes shall comply with AASHTO M 32.

723.09. EPOXY COATED REINFORCING BARS.

These Specifications cover organic protective coatings electrostatically applied to steel bars to be used for concrete reinforcement.

(a) **Materials.** Epoxy coated reinforcing bars and epoxy coating material shall meet the requirements of AASHTO M 284 Specifications, except as otherwise stipulated under these Specifications.

1. ***Reinforcing Steel.*** Reinforcing steel bars shall meet the requirements of Subsections 723.01 or 723.02.
2. ***Coating Materials.*** Coating materials prequalified for use may be obtained from the Materials Engineer's list of approved materials.
   Supply a representative 8 ounce (200g) sample of coating material from each batch to the Materials Division for testing as deemed necessary.
3. ***Color.*** The finished epoxy coating shall be of a color and tone that will give easily apparent visual indications of holidays, damage, or corrosion staining.

(b) **Certification.** A type D certification shall be submitted in accordance with Subsection 106.04.

(c) **Fabricator's Quality Control.** Epoxy coating will be accepted only from fabricators who have an approved quality control program. Submit the quality control program and schedule to the Department for review and approval prior to any coating and/or fabrication.

SECTION 724
STRUCTURAL STEEL

Description. This Section covers the requirements for structural steel, bolts, nuts and washers, shear connector studs, and filler material for welds in Section 506.

724.01. STRUCTURAL STEEL.

(a) **General.** Furnish steel according to the following specifications. The grade or grades of steel to be furnished shall be as specified in the contract documents. Unless otherwise specified in the contract